

REMARKS

Claims 1-4, 6-8, and 35-38 are pending.

Claims 5, 9-34, and 39-59 have been canceled without prejudice.

Applicants thank Examiner Nguyen for indicating that Claims 4 and 36-38 are allowed.

It is believed that the remaining claims are allowable too.

The main point of the present invention is that the heating temperature after the second impregnation step is not higher than 300°C. In the case of catalyst 1 (see pages 46-47 and Tables 1-1 and 3), it is noted that the Ti-impregnated carrier is calcined at 500°C prior to the second impregnation step, but after the second impregnating step the impregnated carrier is heated at 120°C for 16 hours, i.e., not higher than 300°C.

If the temperature of the heat treatment is higher than 300°C, the components held on the carrier will agglomerate and will fail to have high activity. Please refer to page 21 lines 2 to 11 in the specification.

It is kindly requested that the Examiner reconsider her position in view of the following remarks.

The rejection of Claims 1-2 and 6-8 under 35 U.S.C. § 103(a) over the disclosure of U.S. Patent No. 4,080,286 (hereinafter US '286) is respectfully traversed.

US '286 describes a hydrodesulfurization process catalyst that is prepared by successively impregnating an inorganic oxide carrier with a transition metal followed by heating the metal-impregnated carrier (see Examples 1-2, col. 4, lines 8 – col. 5, line 20). A Ti-Ni-Mo-alumina catalyst is prepared as follows (US '286; Example 1; col. 4, lines 7-39):

- (1) impregnating a calcined alumina carrier with Mo;
- (2) heating the Mo-alumina carrier at 121°C;
- (3) impregnating the Mo-alumina carrier with Ni;

- (4) heating the Ni-Mo-alumina carrier at 121°C and then at 538°C;
- (5) impregnating the Ni-Mo-alumina carrier with Ti; and then
- (6) heating the Ti-Ni-Mo-alumina carrier at 121°C and then at 538°C.

The Examiner's attention is directed to steps (4) and (6), which include heating at a temperature of 538°C.

It is unclear why the Office has taken the position that the disclosure of US '286 renders the hydrogenation catalyst of Claim 1 obvious, especially when the claim language states that after the second impregnating step that heating occurs at a temperature of "not higher than 300°C."

The Examiner's attention is directed to the text on page 21, lines 2-11, of the present Specification, which states that the "temperature for the heat treatment is not higher than 300°C...[if] the temperature for the heat treatment is too high, the components held on the carrier will agglomerate and will fail to have high activity." Applicants have previously discussed this aspect of the claimed invention on pages 14-16 of the Amendment filed July 9, 2004. A portion of this discussion, page 16, reads as follows:

The difference between these two catalysts is that catalyst 5 was heated (after impregnating) to a temperature in excess of 300°C. (See page 47, second full paragraph, for experimental conditions for the preparation of catalyst 1; and page 50, second full paragraph, for catalyst 50.) Thus, there is a chemical difference between the two species in that the number of different types of metal bound hydroxyls between the two catalysts is different. This difference manifests itself in the desulfurization activity, which is tabulated on page 72 in Table 3. In short, catalyst 1 is 36 % more active than catalyst 5. This difference is at least partially attributable to the chemical differences between the two catalysts, as detected by IR spectroscopy.

Applicants provide herewith a portion of the data tabulated on pages 71-72 of the present Specification, which compares the properties of Catalysts 1 and 5:

| | Catalyst 1 – Example 1 | Catalyst 5 – Comp. Example 2 |
|--|------------------------|--------------------------------|
| Heating after second impregnation | not more than 300°C | more than 300°C |
| Specific Heating Conditions | 120°C (16 hrs) | 120°C (3 hrs) and 500°C (3hrs) |
| | Composition, wt% | Composition, wt% |
| NiO | 5.0 | 5.1 |
| MoO ₃ | 28.2 | 28.3 |
| P ₂ O ₅ | 2.5 | 2.4 |
| TiO ₂ | 3.2 | 3.2 |
| Al ₂ O ₃ | 61.1 | 61.0 |
| | Physical Properties | Physical Properties |
| Mean Pore Diameter, Å | 85 | 85 |
| Specific Surface Area, m ² /g | 250 | 248 |
| Total Pore Volume, cc/g | 0.53 | 0.52 |
| | Catalyst Activity | Catalyst Activity |
| Rel. Desulfurization Activity | 150 | 110 |

As previously noted, Catalyst 1 is 36 % more active than Catalyst 5. This difference in activity is attributable to the difference in heating after the second impregnating step. If one were to employ the catalyst procedure described US '286, based on the data presented above one would expect to obtain a catalyst having lower activity, when compared to a catalyst prepared in accordance with the process as recited in Claim 1. It is believed that this aspect is unexpected, and serves as a basis of patentable distinction over the disclosure of US '286.

Consequently, it is believed that the present invention is unobvious over the disclosure of US '286.

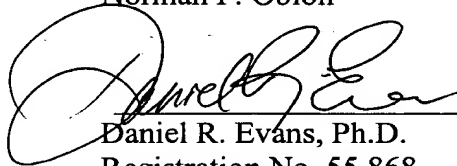
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Reply to Office Action of January 6, 2005

It is kindly requested that the Examiner acknowledge the same and withdraw this rejection. Should the Examiner deem that a personal or telephonic interview would be helpful in advancing this application toward allowance, she is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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A handwritten signature in dark ink, appearing to read "Daniel R. Evans", is written over a horizontal line.

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